RESEARCH AND DEVELOPMENT OF GOATS IN VIETNAM

Proceedings of a National Meeting held on
November 19 - 20, 1992

IAS
Institute of Agricultural Science of South Vietnam
121 Nguyen Binh Khiem Street, Dist. I, HCM

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Editors :

A. Djajanegara
C. Devendra
Nguyen Ngoc Hung

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"This work was carried out with the aid of a grant from the International Development Research Centre, Ottawa, Canada."

SRUPNA

Small Ruminant Production Systems Network For Asia

Published by : Small Ruminant Production Systems Network for Asia (SRUPNA)
PO Box 295, Bogor 16002, Indonesia

Typesetting : Aip Syarifuddin

FOREWORD

There exists widespread interest in the ownership and production of goats for milk in Vietnam, notably in the south of the country. Dairy product is prevalent mainly in the rural and urban-fringe areas, involving women and children who are closely associated with the care and management of the species. Milk is produced for home consumption as well as for commercial sale, and occasionally even processed. It provides precious animal proteins for poor rural people.

Until relatively recently, the development of animal production has been hampered by the war years and lack of resources. Pig and poultry production, and dairy development are now getting increasing attention. With goats, despite the wide interest, there has been very limited support for research and development in Vietnam. This relates to issues such as understanding systems of goat milk production, processing, marketing, and constraints to ownership and management of the animals at the farm level.

It was therefore appropriate to focus attention on the subject in order to stimulate research and development attention especially among planners, researchers and extension personnel. It was envisaged that this will also provide increased contact, a sense of direction to future efforts, as well as strengthen contact among these persons.

To achieve these objectives, a national meeting was jointly planned for the first time with the Institute of Agricultural Science of South Vietnam. IDRC was pleased to be able to provide support for this workshop which was attended by all those associated with research and development of goats. The meeting was held as an activity of the Small Ruminant Production Systems Network for Asia (SRUPNA), with which there is now a link. The proceedings of this meeting have been made available in both English and Vietnamese and should go some way to promote the development and contribution of this species in Vietnam.

C. DEVENDRA
Senior Program Officer
Animal Production Systems (Asia)

INAUGURATION SPEECH

MINISTRY OF AGRICULTURE AND FOOD INDUSTRY

Ladies and Gentlemen,

In Vietnam, goat raising for milk and meat production has been going for a long time. The net return of one dairy goat could reach 1,000,000 VND (= to 100 U$), whereas meat goats are sold around 200,000 VND per animal. Vietnam has also favourable conditions for developing the goat industry, and considered important in efforts to prevent hunger and eleviate welfare of the farmers. The Government provides dairy goats that are considered as an alternative to dairy cattle.

Milk is an excellent food for human beings, in particular, for children, sick and elderly people, because of its high nutritive value. Dairying has been a major enterprise all over the world, especially, in developed countries where favourable conditions and market potentials encouraged development of the dairy cattle industry. In developing countries, in addition to dairy cattle, dairy goats may play a significant role in the overall animal husbandry development in view of its economic value in generating additional income of the rural poor farmers.

Goat milk in Asia has been regarded as an alternative to cow's milk. For instance in India, the annual goat milk production is 1.5 million tons accounting for 3 % of total national milk production. It is apparent that the number of goats is high in India and China with a goat population well over 100 million heads, and followed by Indonesia and Philippines with 10.5 and 3.5 million head, respectively.

With the support of the International Development and Research Centre (IDRC) and the Small Ruminant Production Systems Network for Asia (SRUPNA), I hope that this first National Meeting on Goat Research and Development held at the Institute of Agricultural

Science of South Vietnam would nationally have a significant impact. In this occassion, on behalf of the MAFI, welcome the assistance of International Donor Agencies to develop Science and Technology and carry out collaborative research and training of staff on goat production.

Thank you very much for your attention and I am sure that you would have a successful meeting.

I hereby declare the meeting officially open.

Deputy Minister,
Le Van The

CONTENTS

THE FUTURE OF GOAT PRODUCTION IN VIETNAM

Tran The Thong
(Institute for Agricultural Science)

According to 1991 National Statistics, there are 312,000 goats in Vietnam of which 208,000 are in the North and 104,000 are in the South. The Minister of Agriculture recently has decided to set up a program for goat development, especially, for dairy goat. The Institute of Agriculture Science (IAS), in cooperation with the Agricultural Service of Ho Chi Minh city has been involved in developing the dairy goat in Ho Chi Minh city area. At present, goat milk is more expensive than cow milk (6000-8000 VND vs 2200 VND per liter, respectively). One of the reasons for this is that the supply of goat milk is lower than the demand. Apparently, goat milk is prefered than cow's milk. Vietnamese believed that goat milk has the quality for treatment against Tuberculosis, Asthma, and Rickets. Goat milk has a higher fat content than cow's milk (4.2 vs 3.2 %) as well as lactose content (5.3 vs 4.2 %).

The dairy goat breed in Vietnam is not considered a pure breed, and the highest milk production recorded was 2-3 liters per day, with an average 1-2 liters/day. It is of interest to point out that farmers in Ho Chi Minh city stretch the lactation period because of the high price in the local market. A profit of 2,000,000 - 4,000,000 VND per month was reported to be achieved by farmers from selling goat milk. From France, 120 doses of frozen semen of the Alpine breed that has been imported recently. While high priority is given to develop dairy goats, attention should be paid to develop meat goat also, eventhough its market price may not be as attractive. The development of meat goat would have its effect if the price could be more competitive againts other product in the local market. Research on goats have been very limited as only some surveys have been conducted. In the past, not very much investment has been given for goat production research.

This first National Conference on Goat Production and Development in Vietnam, will mark a significant change in the history of goat production in Vietnam, especially, for dairy goat

production to provide milk for the Vietnamese poor families.

Proposals for research and development being considered with regard to dairy goats include :

- Importation of proven dairy goat breeds from India, Malaysia, Indonesia, etc. that are considered will adapted to the tropical and subtropical climate. These would be crossed with Bachthao breed to improve milk production.

- The use of frozen semen.

- Selection and multiplication of the cross breds in Centers and Institutes to evaluate the milk production potential.

- Disease control measurement, sustainable farm scale (10, 50 and 100 heads per farm), feeding and nutrition of dairy goat in the different ecological areas, processing and marketing, economic, and understanding the dairy goat production systems in relation to agro-ecological problems are also considered.

- Similarly, the improvement of the meat goat may follow the above points.

- Institutions in Vietnam that are involved in Research and Development in goats include those in : North Vietnam : a) Animal Husbandry Research Institute, b) University of Agriculture No.I, c) Department for Agriculture Extension and Production and, in South Vietnam (MAFI). d) Institute of Agricultural Science of South Vietnam, e) University of Agriculture and Forestry - HCM, f) Can Tho University, etc.

For these reasons, we hope to receive longterm research programmes for goats in Vietnam and the assistance of International Donor Agencies (IDA) like FAO, UNDP, IDRC, NCC, may enhance realization of the program.

It is also hoped that training towards MSc, PhD degrees and short term training on milk and meat goat production in developing countries would benefit the development of goats.

It is important that collaborative actions between Vietnamese scientists in the near future, should be developed to promote increased contribution from goats to the national economy.

RESEARCH AND DEVELOPMENT NEEDS ON GOATS

Le Ba Lich

(Animal Health and Production Department,

Ministry of Agriculture and Food Industry, MAFI)

1. INTRODUCTION

The strength of the bio-ecological factors, combined with the agro-forestry system, in the production of dairy and meat type goats is promising. Promotion of the dairy goat should be in places of high marketing and economic efficiency.

The present production level of dairy goats is low (Table 1), however, because of its important role in the rural economy, these are considered as a strategic commodity to be developed.

Table 1. Goat production characteristics (1992)

- Total herd (1000 head)	312.2
- Growing rate (annually %)	-16.1
- Doe (1000 head)	124.0
- Milking doe (head)	600.0
- Milk production (tons)	93
- Live weight prod. (tons)	3960

The target for development of dairy goats in some provinces is shown in Table 2, with some provinces being excluded.

Table 2. Target for goats development (1992)

Provinces	10^3
1. HCM city	500
2. Da Lat	60
3. Surrounding areas	60
4. Tien Giang	300
5. Vung Tau	-
6. Da Nang	-
7. Hue	-
8. Vinh	-
9. Hai Phong	-
10. Bac Thai	-
11. Ha Tay	7
12. Ha Noi	10

Breed development for improved body size and weight, growth rate, increased meat and milk production may have to depend on the Bach Thao (BT) dairy goat, selected and later used for crossing with local goats.

2. DEVELOPMENT OF THE GOAT INDUSTRY

The following outlines the needs in research and development on goats.

a. Breeding :

- A survey should be done to define the potential of the local goat breed, feed and productivity related to ecological conditions.

- It is considered essential that 3 breeding farms (1 in the North, 1 in Center, and 1 in the South) should be established.

- The importation of exotic goat breeds having high milk yields and adapts well to tropical condition i.e : Saanen, Toggenburg, Alpine may needs special consideration with regard to long term development consequences.

- The supply of prozen semen at the Moncada station and the use of Artificial Insemination (AI) should be improved.

- The problem of buck availability in the vicinity of does on oestrus may have to implement a tight rotation schedule (to avoid inbreeding problems as is probably the case at present).

b. Feeding and Management

- Pasture improvement including feed storage in dry season is necessary to ensure feed supply.

- The implementation of rotational grazing and improved herd management should be conducted to avoid damage to food crops. Land utilization around the house of families that raise goats will have to be planted with important fodder crops as fence to supply more feed.

- Utilization of tree leaves that are available in the homeyard and also agro-industrial by-products, the use of concentrates including supply of drinking water for goats.

c. Regionalization

Goats are reared mainly by private households in variable ecological regions and those considered for :

- Dairy goats : are in the urban areas and around big cities with a high demand for milk, like Ha Noi, Ho Chi Minh city, Da Lat, Hai Phong, Da Nang, Hue, Nha Trang, Vung Tau, ensuring the market for goat milk is available.

- Meat goat : other regions that are not the same with the dairy goat regions and these are : Ha Giang, Ha Tinh, Thuan hai and Tien Giang.

d. Health Aspects

- Disease prevention is emphasized and it is important that standard procedures of disease prevention are followed and to ensure good environment (clean, dry, and will ventilated).

- Endo parasites and reproductive disorders warrands further attention. In addition, the production of vaccines against important diseases.

e. Biotechnology

- The use of AI with semen of proven animals may have a certain degree of success in the future.

f. Technology transfer

- Application of improved techniques to improve goat production, feed processing and conservation, preservation of goat meat and milk available in other countries need to be evaluated in relation to local conditons.

g. Training

- Training courses on goat management will need to be organized for extension officers and farmers. These should include training on feeding, breeding, A.I, management, veterinary and economic aspects.

- The establisment of demonstration plots and study tours to well established goat production centre are warranted.

h. Information Exchange

An annual technical review on research and development progress in different regions, through cooperative measures and the assistance of international organizations for the development of the goat industry should be explored.

i. Development

The development of goat may require that subsidies are provided to farmers and marketing aspects of livegoats and its products in domestic and foreign market should be studied.

DAIRY GOAT FARMING IN VIETNAM

Nguyen Ngoc Hung

(Binh Thang Animal Husbandry Research and Development Centre)

Conditions are considered favourable for goat development in Vietnam with mountainous and highland areas. In addition, various forage species for goats are available, and agro-industrial by-products are also produced at low price.

To improve the nutritional status of the human population and increase farmer's income, the development of goats should be an integrated part in the present farming systems.

The Minister of Agriculture and Food Industry has supported the idea to improve the dairy goat production in Vietnam. The Institute for Agricultural Science of South Vietnam (IAS), Binh Thang AHRD Center and Department for Small Animal Research have started programs in dairy goat research and development in Ho Chi Minh city and some provinces such as Tien Giang, Dong Nai, Song Be.

Survey reports (Bien, 1987, Dien and Loan, 1986; Hai, 1988) indicate low milk production of indigenous goat breeds. The local goats commonly named " Grass Goat " are small and poor milk producers, whereas the Batthao goat also known as Bach Thao (Bien, 1978) or Bac Thao (Loan, 1986) are dairy type goats. The latter is believed to be crossings of Saanen; Alpine; Jamnapari and Beetal goats.

The goats in Ho Chi Minh city, Tien Giang, Song Be, Dong Nai provinces (IAS, 1992) are nondescript, hence, presumably should only be recognized as a dairy cross breed.

For a number of reasons, attention is mainly given to the breeding does rather than bucks, as their appearance is relatively good. Upgrading the dairy crossbred goats is considered important. Small herds of 10 to 20 does on average with 1 or 2 breeding bucks are common.

Feeding practices vary between and within region. In Tien Giang province, dairy goats are fed Sesbania leaves, natural grasses, rice bran, coconut waste. In Ho Chi Minh city, by-products are fed such as: Soybean residue, mungbean sprouted waste, pineapple waste, etc.

Many goat farmers do not provide drinking water although the goats are kept in barns and milked 2-3 times a day.

There is a low incidence of disease outbreaks in dairy goats, with some common health problems like diarrhoea (22%), tympany (11%), and scabies (8%). It is also considered important to reduce mortality rate of preweaned kids through prevention measures against infectious and parasitic diseases.

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RESEARCH AND DEVELOPMENT ON GOATS IN HANOI AGRICULTURAL UNIVERSITY

Cu Xuan Dan and Dang Vu Binh

(Hanoi Agricultural University)

Hanoi Agricultural University (HAU) was established in 1956. At present in HAU there are 463 lecturers, 54 professors and associate professors, 108 candidate doctors, and over 3,000 students.

The curriculum at HAU include crop science, animal science, veterinary science, agricultural economics, land management and agricultural mechanization. Besides undergraduate training courses, HAU has opened post-graduate courses towards masters and doctorate degrees. Teaching, research and transfer of technology to increase agriculture production at HAU include some activities on goat production.

In 1965 - 1968 goat and sheep production course was a separate subject and later only mentioned in 1969 - 1979 to undergraduates in animal science. In the past 3 years, goat production was considered as a separate subject of 2 credits points (30 hrs), but is now an optional subject in animal science course. Text books on this subject, in particular, reference books, magazines, documents on goat production in Vietnamese language, are very limited in HAU library.

Activities in research and development on small ruminant production at HAU are as follows :

A. Up to 1989

- Adaptability of Mongolian hair sheep in 3 provinces (Sonla, Quangninh, and Vinhphu province)

- Survey to describe available breeds, feed sources, management practices in the northern provinces (Thanhhoa, Caobang, Nghean, Hatinh)

- Transfer of technology to peasants in mountainous provinces (Caobang, Langson, Yenbai, Tuyenquang).

- Mineral supplementation trials in diets for does and kids, feed processing to increase feed intake; control and prevention of common diseases.

- Studies on physiology of digestion were conducted with mature goat. The goat were fitted with rumen and abomasum cannulae to measure changes of volatile fatty acids, pH, and NH_3 concentrations in the rumen related to protein metabolism. Several strains of microorganism in the rumen have been identified. Changes in blood glucose, ketones and spare alkalis before and after eating will be accordingly reported.

B. From 1989

Research and development activities of HAU on goats have kept pace with practical demands. Several surveys have been carried out on goat production in variable ecological locations such as Gialam district (Hanoi) in the Red River delta, Truongyen commune (Hoalu district, Ninhbinh province) in a limestone mountain area, and Yenhuong commune (Hamyen district, Tuyen Quang province) in the Northern mountain area. It appeared that in recent years, goat production has increased considerably. Goat population has doubled over the past 3 years. Unfortunately, foot and mouth disease which had not been found in Vietnam over 25 years, was found in Truongyen and Gialam in 1991.

Feed sources for goats have been identified in Hatrung district (Thanhhoa province), Hoalu district (Ninhbinh province), Quyhop district (Nghean province) and Gialam (Hanoi). A table of chemical composition and nutritive values of more than 30 feed plants for goats is now available. In two locations, namely Truongyen commune (Hoalu district, Ninhbinh province) and hamlet I (Yenlap commune, Hamyen district, Tuyen Quang province), some integrated activities on the field in forestry, crop production, animal production and aquaculture have been initiated.

A workshop on goat production and short-term training courses on feeds and feeding, housing and reproduction have been undertaken. In Trangan village, a goat production association has been established (consisting of 12 households at present) to meet the objectives of the program.

In cooperation with the Animal Research Institute (ARI) (Ministry of Agriculture and Food Industry) and the Hanoian Animal Breeding Corporation 30 dairy goats from Thuanhai province to Bavi (Hatay province) were transfered to initiate a breeding program. Also 14 dairy goats from Southern provinces were distributed to breed at Caudien farm (Tuliem district). Semen of Alpine and Saanen goats from France have been inseminated to does but no conceptions have so far been achieved. The onset of oestrus in the does in Summer appears to be a problem.

Plans are being made to carry out fundamental surveys to get a full year-round assessment on present status of goat production in different ecological zones.

Develop farming systems models of integrating meat goat into silviculture, food crops and others. Studies to develop dairy goat production in Hanoi countryside to increase family income, improve peasants nutritional status and generate employment.

GOATS IN SOUTH VIETNAM

Le Dang Danh

(University of Forestry and Agriculture)

In South Vietnam, Thuan Hai province is the most developed region for goat production because it is the most arid region and related to ethnical preferences. In Ho Chi Minh city and the surrounding areas such as Tien Giang, Long An, the dairy goat production has been developed since 1979.

The adult goat in Thuan Hai province weight between 34 - 40 kg with a height between 62.5 - 67.7 cm. In Long An province, they weight 31 - 39 kg and height of 59.4 - 65.2 cm. Goats in Thuan Hai are bigger than those in Long An.

The young male reached sexual maturity between 3 to 5 months but the farmers usually use them after one year old. Male/female ratio is 1/15 - 1/20 with a conception rate more than 95 %.

Female goats have first oestrus at 4 - 5 months of age and farmers usually allow them to mate after 8 months old. The onset of oestrus is 60 - 75 days after parturation. In Ho Chi Minh city, there are many farmers that are milking the goats to 6 months and obtained about 150 kg milk.

In Thuan Hai province, the average goat herd is 80 heads. They are mainly grazed in the mountain area. Concentrate feeding is only given to milking goats. In Ho Chi Minh city and the surrounding areas such as Tien Giang, Long An, goat rasing for milk has developed slowly.

PEANUT HAULMS FOR PREGNANT AND MILKING DOES

Bui Xuan An, Duong Thanh Liem, Le Ngoc Minh and Dang Phuoc Chung

(University of Forestry and Agriculture)

INTRODUCTION

Peanut is widely grown in South Eastern Vietnam, especially after the irrigation system of Dautieng began to operate. Its by-product, peanut haulms, could be used as feed. Conservation by many methods, such as : sun drying, ensiling or mixted with grass, with or without additives (Duong and Bui, 1988) has been practised. The objective of the study was to assess the nutritive value of peanut haulms as supplement for dairy goats.

Does were fed a basal diet consisting of Napier grass *ad lib.*, Leucaena leaves : (500 g during pregnancy and 700 g during lactating) and concentrate : (150 g during pregnancy and 350 g during lactation). Four does were fed the basal diet and ensiled peanut haulms *ad lib.* and free access of water. Peanut haulms was chopped (3-5 cm) and ensiled with 4 % molasses. The trial lasted 150 days :

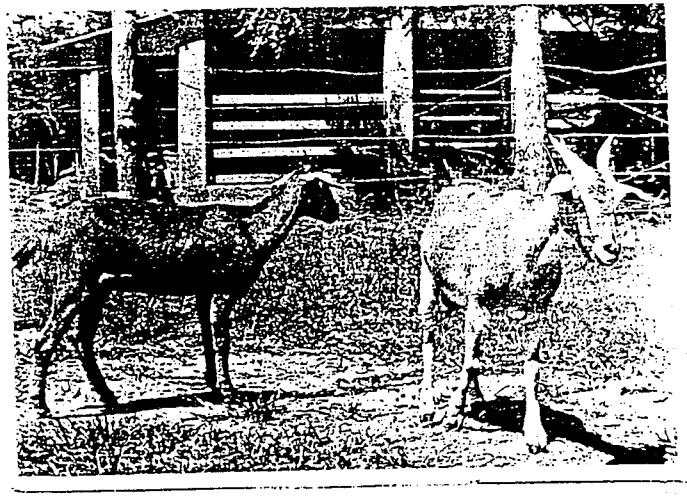
From 1^{st} to 14^{th} day as feed adaptation periode

From 15^{th} to 60^{th} day as pregnancy period

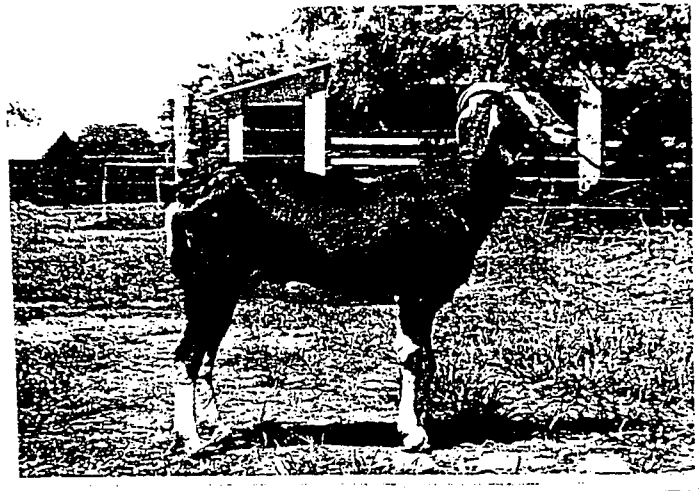
From 61^{st} to 120^{th} day as suckling periode

From 121^{st} to 150^{th} day : milk production study.

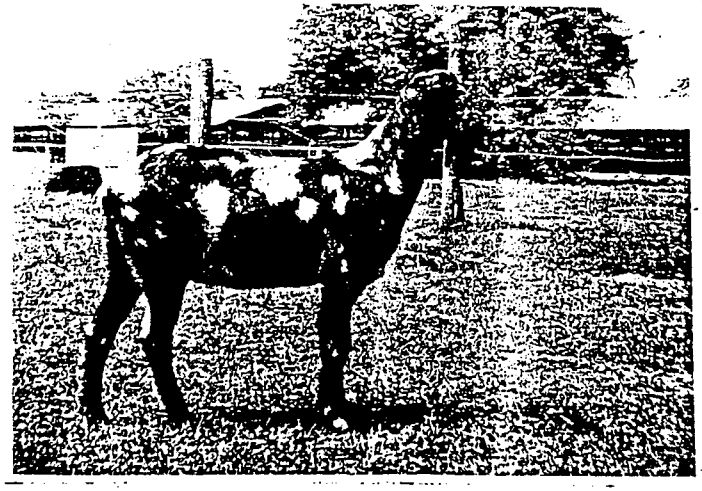
Measurements : Liveweight of does and calves (14 days/time), feed chemical composition, feed intake (daily), milk composition in first month of milking (10 days/time), milk composition and milk yield in third month (3 last days at each period), animal health.



Local
breed
Dê cỏ



Bac_Thao
breed
Bắc Thảo
có sừng



Polled
Bac_Thao
Bắc Thảo
không
sừng

Bac_Thao
kids
Dê con
Bắc Thảo

In another trial, four does were given Guinea grass *ad lib.*, 600 g Leucaena leaves and 350 g concentrate over 90 days.

Table 1. Chemical composition of feeds (% as DM basis)

FEEDS	DM	CP	CF
Napier grass	20.3	8.0	39.6
Leucaena leaves	33.5	24.2	19.9
Concentrate (exp. 1)	90.0	18.6	7.9
Concentrate (exp. 2)	84.0	19.6	3.1
Ensiled peanut haulms	29.3	8.7	37.5
Sun dry peanut haulms	90.7	12.9	37.0

RESULTS AND DISCUSSION

There were no differences between treatments. DM consumption of peanut haulms was about 14 % of DMI. All does were in good condition.

The ensiled peanut haulms consumption was 20 % of DMI. The supplementation increased significantly LW gain of does and butter fat content but there were no differences in other parameters at suckling period.

EXPERIMENT 1.

Table 2. Liveweight (LW) and feed intake during pregnancy

	Control	Supp-lemented	Probability
Initial LW (kg/doe)	25.7	25.8	NS
LW gain (g/day)	95	87	NS
DM intake (g/day)	548	558	NS
(g/kg LW)	21	22	NS

Table 3. Liveweight (LW) gain, feed intake and milk composition during the suckling period

Parameters	Control	Supp-lemented	Probability
Initial LW (kg/doe)	22.3	23.0	NS
Doe's LW gain (g/day)	8	12	*
Feed intake (g/day)	3571	3313	NS
peanut haulms	-	752	
Doe's DMI (g/day)	1068	1083	NS
(g/kg LW)	47.5	46.7	NS
peanut haulms		221	
Number of kids/doe	1.3	1.5	
Kid LW gain (g/day)	107	93	NS
(g/doe)	143	140	NS
Milk composition (%)			
Butter fat	5.0	6.2	*
DM	13.2	12.9	NS
Cazein	3.4	3.6	NS
Ash	1.1	0.9	NS

* : significant difference ($P < 0.05$) NS : no significant difference ($P > 0.05$)

Table 4. Milk production and feed intake during the third month of milking

Parameters	Control	Supp-lemented	Probability
Milk yield (kg/day)	0.54	0.62	*
Milk composition (%)			
Butter fat	4.2	5.1	***
DM	14.6	14.3	NS
Casein	3.4	3.5	**
Ash	1.1	0.9	*
Butter yield (g/day)	22.7	31.8	*
Feed intake (g/day)	3053	3106	NS
- peanut haulms		708	
DMI (g/day)	953	1028	NS
(g/kg/LW)	40.5	43.7	NS
- peanut haulms		207	

*** : significant difference ($P < 0.001$) * : significant difference ($P < 0.05$)
** : significant difference ($P < 0.01$) NS : no significant difference ($P > 0.05$)

In the third month of milking, the milk yield and milk composition were better with supplementation. The milk yield and butter yield increased 15 and 40 %, respectively.

EXPERIMENT 2.

Table 5. Feed intake of does with and without supplemental dry peanut haulms

Parameters	Control	Supp-lemented	Probability
DMI (g/day)	1257	1336	*
(g/kg LW)	46	49	*
peanut haulm	-	476	
Protein intake (g/day)	383	404	*

* significant difference ($P < 0.05$)

Table 6. Milk production of does with and without supplemental dry peanut haulms

	Control	Supp-lemented	Probability
Initial milk yield (kg/day)	0.45	0.42	NS
Exp. milk yield (kg/day)	0.33	0.36	*
Milk composition (%)			
Butter fat	4.3	5.2	*
DM	12.5	13.1	NS
Ash	1.2	1.2	NS
Butter fat yield (g/day)	14.2	18.7	*

* : significant difference (P < 005) NS : no significant difference (P > 005)

Peanut haulms consumption accounted for 36 % the total DMI. The supplementation reduced grass intake but increased 6 % DMI, 10 milk yield and 32 % butter yield.

CONCLUSION

The supplementation of ensiled or dry peanut haulms to dairy does increased the feed intake, milk yield, butter yield and there weren't negative effects to animal health. The milk yield increased 10-15 % meanwhile the butter yield increased 40-50 %. The peanut haulms can replace part of green fodders.

Depending in conditions of each farm, farmer can conserve the haulms by sun drying or ensiling. Feeding of goats with better local resources increase farmer's income.

GOAT RAISING IN NINH THUAN PROVINCE

Nguyen Thi Mai

(Ninh Thuan Agriculture and Forestry Service)

INTRODUCTION

Ninh Thuan province is located in the south of Central Part of Vietnam of 153,459 ha (about 45.23% of Vietnam) with denuded hills cover about 27.78%, and wild land of 19,665 ha or about 5.79% of the area.

The climate is arid during the year with average rainfall about 670-700 mm per year, and rainy season in October and November.

For agriculture, the source of water is the Nha Trinh Lam Can irrigation, and other small and artificial lakes. Many people living in Ninh Thuan (Kinh people, and other ethnic groups such as the Cham, the Rakley, the K'Ho etc.) have various religions; Buddhism, Catholoc, Brahminism, Bani, hence, with needs and customs of consuming products that are quite different.

Inview of the typical weather and climate, large herding grounds favourable customs and social habits, Ninh Thuan province is one province in which various kinds of domestic animals of good qualities could be found including sheep and goats.

One family with about 30 does produce 40 to 50 liters of fresh milk, which is sold immediately or condensed. Does that gives birth to four or five kids have insufficient milk to feed the kids, and reduces the amount of milk that can be sold.

Goat can produce more milk than cows in relation to body weight. Goats are generaly mated after kidding for two oestrus cycles.

THE "CO" GOATS

Meat goats on the other hand weigh only about 20 - 30 kg and

produces a little milk. The total number of goats is around 15,000 in Ninh Phuoc and Ninh Hai districs and some villages in Ninh Son district. Some families raise a herd of 700, but most of them raise 200 to 300.

The management of goats vary and are concentrated in Tri Hai village (about 3,300) and Phuoc Nam village (about 4,500) in the hills and mountains that are the natural herding grounds. Sources of natural vegetation are available.

- Goats are grazed in the morning and return to their barn in the afternoon

- Does with kids are given additional feed such as pea leaves, stubble, straw or molasses when they return in their barn. The barns for goats are very simple with wooden floor (for small herd) and only a fence (for larger herds).

As the climate of Ninh Thuan is generally dry, goats hardly suffer from diseases.

ECONOMIC ASPECTS ON GOAT RAISING

Goat meat is consumed in larger quantities outside the province such as in Ho Chi Minh city, Vung Tau and Ba Ria provinces. In some local areas, the Cham people use goat meat in religious celebration i.e. the traditional Kate Tet. The price of goat meat has increased over the past year.

Goats of 6 - 7 months old weigh between 15 to 25 kg and have a carcass about 38 - 49 %. A doe of 8 months old is worth around 500,000 to 600,000 VND, whereas manure is sold at about 30,000 VND/m^3.

Goat milk is mainly consumed in the local areas, the price of which is around 3,200 - 3,500 VND per liter, and condensed milk costs 8,000 - 10,000 VND per liter.

Goat milk not only is an excellent food to overcome malnutrition, but it is also used as a kind of skin cream by women. It contains 4 - 5 % fat and 9 - 10 % of dry matter. The price of goat milk and meat is expected to increase in the near future because of increased demand. Increased price will obviously encourage farmers to invest and improve the dairy goat production in the province.

DEVELOPMENT CONSTRAINTS

As goats in Ninh Thuan province are mainly raised by farm families in small numbers, the organization, techniques, investment and attention are still very limited. The need for capital investment to assist farmers and improved management, utilization of improved breeds, prevention againts disease, organization of farmers will need to be developed to have a significant impact in the farm family economy.

BODY CONFORMATION AND PRODUCTIVITY OF GOATS AT LONGXUYEN OF ANGIANG PROVINCE

Doan Huu Luc

(Angiang Province Agriculture Service)

In the two years of 1987 and 1988, in collaboration with the Faculty of Animal Husbandry and Veterinary Medicine (Cantho University) Department of Agriculture of Angiang province has conducted a survey to characterize the body conformation and productivity of goats of Longxuyen. The survey involved 485 goats consisting of 411 does (85.5%) and 70 bucks (14.5%). In general, goats were found to have three main colours : black, white-spotted black, and brown. They have white stripes on the front head, ventral surface, medial surface of the thigh and carblade borders.

The brown-hair goats often have a dark brown frontal stripe. The average measurements of the goats surveyed at Longxuyen are reported as follows.

Table 1. Average body measurement of does in relation to age

Measure-ment (cm)	1mth	3mth	6mth	1yr	2yr	3yr	4yr	5yr	>5yr
n	5	23	14	104	74	53	18	13	4
Height at withers	36.4	44.1	51.3	62.0	65.7	66.9	67.6	67.3	65.5
Height at sacrum	37.6	47.0	55.8	65.6	68.3	69.6	70.4	70.8	69.5
Heart girth	36.0	47.2	55.9	73.3	78.0	80.4	82.7	83.5	82.7
Shank girth	5.8	6.5	7.4	8.2	8.4	8.7	8.8	9.1	9.0
Chest width	7.4	8.4	10.2	13.3	14.1	15.0	15.4	15.9	15.2
Chest depth	12.4	16.3	19.8	26.0	27.8	28.5	29.2	29.7	28.7
Rump widht	6.0	7.1	8.8	11.6	13.4	12.9	13.2	13.9	12.5
Head lenght	9.6	11.5	13.5	16.3	17.4	17.8	18.0	18.1	18.2

Table 2. Physiological condition of does

Parameter	Growing doe		Mature doe	
	X ± SD	CV %	X ± SD	CV %
Body temperature (°C)	38.9 ± 0.4	1.0	38.6 ± 0.4	1.4
Pulse rate	114.9 ± 8.7	7.6	102.6 ± 11.0	10.8
Respiratory rate	54.0 ± 7.6	14.0	51.4 ± 8.9	17.4

Tabel 3. Reproductive parameters[9]

Parameter		Value	% Distribution
Age at first mating (n=115)	6 months		3.48
	7 - 8 months		60.87
	9 months		35.65
Age at first kidding			
(n=30)	less than 1 year	6.67	
	1 year	36.67	
	over 1 year	56.67	
Weaning to first oestrus			
(n=59)	21 days	5.08	
	1 month	20.34	
	2 months	74.28	
Oestrus duration (n=61)	2 - 3 days	70.49	
	4 - 5 days	26.23	
	1 week	3.28	
Sexes of kids (n=98)	male	57.96	
	female	30.90	
	hermaphrodite	2.04	
Gestation period			
(n=50)	150 days ± 2.07		
Litter size	1 kid	25.0	
	2 kids	50.0	
	3 kids	20.83	
	4 - 5 kids	4.17	
Birth weight			
Male (n=15)	2.33 kg ± 0.57		
Female (n=17)	2.40 kg ± 0.76		
First mating age of buck	6 months	11.76	
	7 - 8 months	70.59	
	9 - 12 months	17.65	

Tabel 4. Milk yield of goats of different ages

Age of doe	Daily milk production (litres)		
	Lowest	Highest	Average
12 months old	0.42	1.78	0.90
(n = 15)	0.12	0.35	0.15
2 years old (n=37)	0.51	2.15	1.10
3 years old (n=33)	1.04	2.38	0.79
4 years old (n=30)	0.55	2.07	1.10
5 years old (n=15)	0.54	1.88	1.01
6 years old (n=14)	0.38	1.77	0.88
7 years old (n=6)	0.42	1.92	0.92

Carcass measurement of 6 mature goats (3 males and 3 females) slauthered is shown Table 5.

Table 5. Carcass measurement of goats

Component	Male	Female
Liveweight (Kg)	27.3	25
Carcass : weight (kg)	12.9	9.7
percentage (%)	46.8	38.8
Entrails : weight (kg)	6.1	7.2
percentage (%)	22.1	28.7
Lean meat (% of carcass)	69.3	70.6
Fat (kg)	0.7	0.2
(% of carcass)	2.7	1.0
Bone (% of carcass)	30.7	29.4
Offals (kg)	0.8	1.6
(% of carcass)	2.7	6.2

CONCLUSION

The survey revealed that :

1. Goats reared at Longxuyen town are small of variable size, indicating large genetic variability.

2. Goats are reared under traditional management, and as the number of bucks are limited, hence, young bucks are often used for mating

3. Selection program of goats is recommended to improve genetic quality of the local goat herd.

GOAT HUSBANDRY AT THE GOAT AND RABBIT RESEARCH CENTRE - ANIMAL HUSBANDRY RESEARCH INSTITUTE

Dinh Van Binh, Nguyen Quang Suc and Chu Dinh Khu

(Animal Husbandry Research Institute)

The Goat and Rabbit Research Centre at Son Tay, Ba Vi area have the following climatic condition :

Temperatur	Humidy	Tempe-rature	Annual rain fall (mm/y)	Sun light (hour/y)
Average	23.4	83	1820	1425
Highest	27.2	84	-	-
Lowest	20.9	75	-	-

About 50 dairy goats originated from Thuan Hai province were raised at the Centre and after 1 year observation, the production performances of the goats are as follows :

A number of goats in Son La and Ninh Binh provinces have been survayed and the results are presented in the following tables.

Table 1. Body-weight of goats in relation to age in (kg)

Origin	Age (months)						
	At brith	6	12	18	24	30	36
Ninh Binh male	2.0	11.4	18.0	21.5	24.0	27.7	30.0
female	1.88	10.6	17.1	19.0	23.5	26	
Son La male	2.1	14.1	22.1	26.2	29.6	34.0	42.4
female	1.95	12.6	19.5	21.8	24.9	29.1	35.8

Table 2. Carcass measurements of goats

Goat line	L.W (kg)	Dressing (%)	T.bone	MHead	Bone (%)	Blood	Skin	Intestines
Ninh Binh	21.7	45.8	31.3	7.2	11.4	4.0	7.5	30.7
Son La	27.4	39.8	29.8	6.3	9.2	4.5	6.3	35.2

	Water (%)	Prot. (%)	Fat (%)	Mineral (%)
	76.5	20.2	1.6	1.1
	79.5	18.9	1.6	1.1

Table 3. Body weight of Bach Thao goats in relation to age

Age (months)	1	2	3	4	5	6	7	8	9	
Male weight	2.88	7.0	10.07	12.97	17.53	19.0	21.27	23.5	25.0	28.2
± SE	0.15	0.65	0.63	0.44	1.51	0.62	0.78	0.35	0.95	0.9
Fem. weight	2.37	4.84	8.7	10.68	12.68	16.0	17.7	19.9	22.1	24.0
± SE	0.11	0.75	1.54	0.72	0/86	0.76	1.14	0.8	1.0	

Table 4. Milk production of Bach Thao goats raised in the centre with different ages

Lactation length	180 - 210 days
Dairy milk yield : (at average)	0.828 litre
First month :	0.991 l
Second month :	0.981 l
Third month :	0.834 l
Forth month :	0.722 l
Fifth month	0.653 l
Sixth month :	0.637 l

Table 5. Milk composition

Parameter	Value
Water in total :	84.6
Dry matter	15.4
Crude protein	5.1
Milk fat	4.1 - 5.2
Mineral	0.9
Calcium	0.2
Phosphorous	0.2

Table 6. Reproductive parameter

Parameter	Value
Age at first oestrus	5 - 5.5 month
Age at first insemination	7 - 8 month
Duration of oestrus	2 - 4 days
Heat cycle	16 - 24 days
Pregnant period	148 - 152 days
Litter size	1.7 kids/litter

Table 7. The physiological parameter of dairy goats in the centre

Parameter	In Spring and Summer	In Autumn and Winter
Body temperature	38 - 45.5 °C	38 - 39 °C
Respiration rate	20 - 36	18 - 30
Pulsa rate	72 - 90	70 - 84
Haemoglobin g % -		9.2
Leucocytes (tho/mm3)		13.4
Red globule (mil/mm3)		12.3

DISEASE PROBLEMS

The goats are generally in good condition. There is no disease breakout the first year, and the mortality rate has 3%. Studies on fodder trees include the production of 7 varieties of grass and legume varieties at various cutting intervals. Their nutrient contents are compiled. Agricultural by-products and industrial by-products are important feeds for goats.

GOATS IN CAO BANG PROVINCE (PEOPLE COMMITTEE OF CAO BANG PROVINCE)

Nguyen Thi Nuong

(Agro-Forestry Service)

Cao Bang is a mountainous region bordering with China in the East and North, Lang Son and Bac Thai provinces in the South and Lang Son province in the West. The total area is 844.5 km^2 with a topography of

a) Calcareous

A total area of 208,900 ha (25% of total area) in the East and North of the province is separated by canyons and hills, 500 - 600 m above sea level, is considered calcareous.

b) Terrai

Terrai areas of 257,900 ha (62% of total area) are found in the West, South and in the Centre of the province. The average elevation is 400 m above sea level with slopping areas of 15 - 25%. These areas are considered suitable grasslands for livestock.

Goats have been raised in Cao Bang since 1960 developed well with 65% having 2 kids per litter. Goats are raised under extensive systems where attention is limited. The economic value of goat has been recently recognized hence the importance to develop goats in Cao Bang province. The price of one kg liveweight of goats in is 5000 VND, whereas that for cattle is only 3500 VND. The number of goats increased from 3230 in 1981 to 6250 in 1991.

CONSIDERATION FOR THE FUTURE

Raising goats in combination with cattle may be necessary to make effective use of the grasslands. For the high mountainous regions, goat husbandry is probably the major activity in animal husbandry of advantage.

GOATS IN NINH BINH PROVINCE

Nguyen Manh Rat

(Agro- Forestry-Fishery Service)

Ninh Binh has large forestlands and rocky mountains. The forestry lands can be divided into

- Forest lands 522 ha

- Lands with forestry potential 8,263 ha

- Rocky mountains with trees 5,638 ha

The present goat population is 9250 heads and they are kept in small herds of 5 - 10 goats.

Under totally free grazing management in the mountains and partly in barns. At 12 months, the liveweight reached only 12 - 15 kg, and native bucks could weigh 35 - 40 kg and does 30 - 35 kg.

Under extensive raising the reproduction of goats is low. Goat development in the province is minimal, but goats have certain advantages that are beneficial to the farmers. It is proposed that the Institute of Agricultural Science of South Vietnam provide training on goat technology.

Foot and mouth disease and diarrhoea are the two major diseases in the wet season. Hepatic and intestinal parasites have been found in low and water logging areas. The disease incidence is known in high and mountainous areas.

SOME MEASUREMENTS OF GOATS KEPT IN BINH THANG

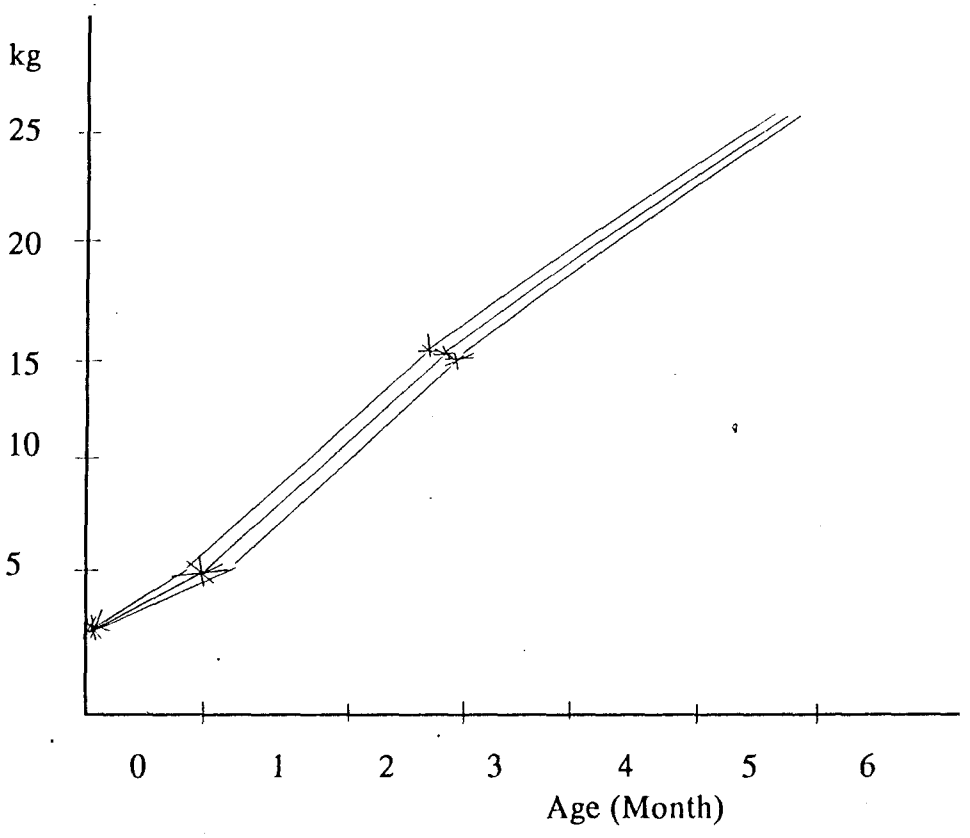
Le Thanh Hai, Nguyen Ngoc Hung and Tran Van Tinh

(Binh Thang Animal Husbandry Research and Development Centre)

In developing countries, especially in Asia and the Pacific region, dairy goats may become important in view of their potential for milk production. Recently, the Vietnam Government has considered to develop dairy goats, although the use of milk in Vietnam still low, but it is known to contribute significantly to farmers income.

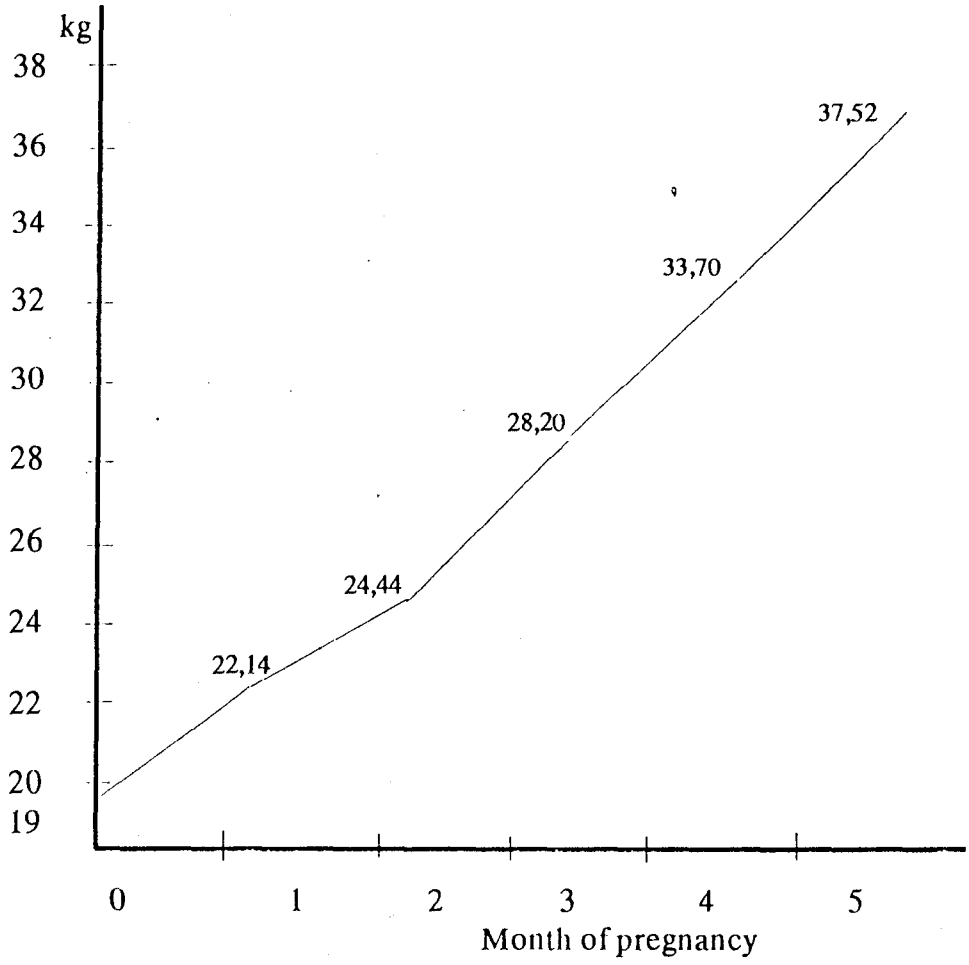
In order to assess the genetic potential of the local cross breeds, some measurements have been made. The average weight of goats raised at the Centre reached at birth weight 2.43 $\pm$ 0.12 kg, at 1 month 5.10 $\pm$ 0.12 kg, at 3 month 12,74 $\pm$ 0.20 kg, and at 6 month 19.25 $\pm$ 0.37 kg. with average gains from birth to 3 months of 114 g/d and from 3 to 6 months old 72 g/d (see diagram 1)

Diagram 1. Cumulative growth rates of goats from birth to 6 months



In the first month of lactation, the average milk yield produced per day was 1.02 kg and decreased in later months. Calculated from only 3 does having 2 lactations, it was indicated that milk yield at the second lactation was higher. Milk produced at the Center has a protein content of 4.3 %, lactose 4.4 %, fat 4.05 %.

Diagram 2. Body weight changes during the pregnancy period.



Kids are allowed to suckle 4 x a day up to 42 days old, thereafter 3 times per day. Feed supplements consisting of roasted fine ground soybean and corn (20 g/head/day) were given from 2 to 3 weeks of age.

CONCLUSIONS

Growth rate of goats were considered good (114 g/d at for first 3 months after birth) and continued selection of the local goat will ultimately improve milk production in South Vietnam.

CONCLUSIONS AND RECOMMENDATIONS

The national meeting on Research and Development in Vietnam was held on November 19 - 20, 1992 at the Institute of goats of Agricultural Science (IAS) of South Vietnam. The objectives of the meeting were as follows : 1) Provide a forum for scientists and extension workers engaged in the development of goats to get together, 2) Discuss current activities 3) Provide for the dissemination of information, and 4) enable the definition of future research and development derections in Vietnam.

The meeting was attended by 26 participants from various institutions throughout the country. In this inaugurational meeting, Dr. Le Van The, the Deputy Minister of Agriculture and Food Industry, indicated his interest to develop the goat industry in Vietnam in the efforts to provide food and elleviate the welfare for the rural poor people. The Director of IAS, Professor Tran The Thong, stressed that this meeting marks the awakening and a significant change in the history of goat production in Vietnam.

From the International Development Research Centre (IDRC), Dr. C. Devendra, welcomed the participants and indicated that this meeting was very useful to promote interest in the species in the context of natural resource use and management. It also fitted in well as one of the objectives of the Small Ruminant Production Systems Network for Asia (SRUPNA).

A total of 11 papers were presented and discussed during the meeting, by representative from Research Institutes, Universities, Extension Services and the IAS. The meeting provided a useful opportunity for intensive discussions and deliberations. The following conclusions and recommendations resulted from these :

1. There was concensus that the goat industry in Vietnam should be developed in view of its incresing importance and role in eleviating welfare and nutritional status of the rural poor families.

2. It was recommended that a national program on goat research and development should be established with commitments of all parties concerned.

3. As a follow up, a national steering committee was formed with Prof Tran The Thong, Director of IAS, ss chairman. The composition of the steering committee were as follows :

- Dr. Le Viet Ly, of the Animal Husbandry Research Institute of the Ministry of Agriculture and Food Industry.

- Representative from the Universities

- Representative of the Department of Animal Health and Production

- Dr. Vo Ai Quac, Deputy Dean of the Faculty of Animal Husbandry and Veterinary Medicine, University of Can Tho is to act as national coordinator.

4. The immediate task of the Steering Committee was the setting up of priorities and guidelines, and obtain commitments from all parties concerned. The Committee was also requested to prepare and evaluate proposals for solicitation to the Government and Non-Government Organisations, and International Agencies. In evaluating proposals, consideration should be given to specific needs in accordance with respective agro-ecological condition, funds available and manpower development. It was suggested that the steering committee should within 2 months immediately finalize and agree upon a proposed national research and development program on goats.

5. It was agreed that the development of the goat industry should concentrate on dairy goat production in South Vietnam, and meat goat production in North Vietnam. This does not, however, limit the development of dairy or meat goat in the respective regions, except, that priority should be given to one or the other in view of the limited resources, and technical experties available in the country.

6. The approach proposed is initially through intensive " on-farm " studies to really understand and evaluate the advantage and constraints faced by the farmers in existing production systems.

7. Genetic improvement was given first priority. However, it was stressed that the existing indigenous genetic resources should be fully studied before there is largescale use of imported breeds. Continuous monitoring of these programmes is essential.

8. The use of imported breeds in cross-breeding programmes should be strictly confined to certain locations, before final evaluations have been made to accept that the genetic changes developed are superior, prior to distribution to farmers. The culled bucks should be castrated and sold.

9. The need for establishing two breeding centres : one for dairy goats and one for meat goats for research and development was recognised, funds for which will need to be explored from government sources. The Department of Animal Husbandry should provide recognition and further support those centres that have already been established.

10. It was also recommended that possibilities be explored to take advantage of the experience and knowledge within the country as well as in Asia. The conduct of training programmes were considered essential and recommended. Universities in the country were also encouraged to introduced goat production in their curricular and also provide increased training at the degree level.

11. The meeting also recognised the importance of contact between scientists within and outside the country, as well as provide a mean for promoting information exchange.

LIST OF PARTICIPANTS

NAME	ADDRESS
Dr. A. Djajanegara	SRUPNA Coordination Unit, Indonesia
Mr. Bui Xuan An	Faculty of Animal Husbandry and Veterinary Medicine, University of Agriculture and Forestry, HCM city
Dr. C. Devendra	IDRC, Regional Office, Singapore
Mr. Cao Xuan Thin	Dy Director, Buffalo and Forage Research Center, IAS
Mr. Dang Vu Binh	Faculty of Animal Husbandry, University of Agriculture, Ha Noi
Mr. Dinh Huynh	Head, Department for Animal Nutrition and Feeding Research, IAS
Mr. Dinh Van Binh	Director, Goat and Rabbit Research Center, AHRI
Doan Huu Luc	Agriculture Service of An Giang province
Mr. Ho Khac Nhu	Dy Director, Department of Animal Husbandry and Veterinary Medicine, MAFI
Mr. Le Ba Lich	Dy Director, Department of Animal Husbandry and Veterinary Medicine, MAFI
Mr. Le Dang Danh	Faculty of Animal Husbandry and Veterinary Medicine, University of Agriculture and Forestry, HCM city
Dr. Prof. Le Viet Ly	Dy Director, Animal Husbandry Research Institute, Ha Noi
Dr. Le Xuan Cuong	Head, Department for Cattle and Buffalo Research, IAS

Le Xuan Trinh	Correspondent, Science National Newspaper
Mr. Luu Van Tan	Department for Cattle and Buffalo Research, IAS
Mr. Nguyen Ngoc Hung	Dy Director, Binh Thang Animal Husbandry Research and Development Center, IAS
Mrs. Nguyen Thanh Thuy	Director, Center for Technology Transfer, IAS
Mrs. Nguyen Thi Mai	Agro-Forestry Service of Ninh Thuan province
Mr. Tong Quang Minh	Assistant Head, Department for Research Planning and International Relation, IAS
Dr. Prof. Tran The Thong	Director, Institute of Agricultural Science of South Vietnam (IAS)
Mr. Tran Van Tinh	Department for Small Animal Research, IAS
Dr. Prof. Vo Ai Quac	Assistant Dean, Faculty of Animal Husbandry and Veterinary Medicine, University of Cantho
Vu Thai	Director, Agro-Forestry Service of Cao Bang province